

## Remarks

**[0001]** Herein, the "Action" or "Office Action" refers to the non-final Office Action dated April 4, 2008.

**[0002]** Applicant respectfully requests reconsideration and allowance of all pending claims of the application. Claims 1-35 and 40 are presently pending. Claims 1, 3, 15, 18, 27, and 35 are amended herein. Claims 36-39 are canceled herein. New claim 40 is added herein. Support for the amendments can be found at least at pages 10-27 and Figs. 1-33 of the Specification "as-filed."

### **Allowable Subject Matter**

**[0003]** Claim 20 is indicated as being dependent upon a rejected base claim, but allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims (*Office Action*, p.20). Applicant appreciates the indication of allowability, and appropriate amendments have been provided herein.

**[0004]** More specifically, new claim 40 has been added herein to claim the subject matter which has been indicated as allowable by the Office (*Office Action*, p.20). Claim 40 simply represents the limitation of claim 20 rewritten in independent form to include all of the limitations of the base claim (original claim 1) and any intervening claims. The presentation of the indicated allowable material as new claim 40 is purely

of form (*i.e.*, dependent format to independent format), and is not to overcome prior art or any other objections. Accordingly, Applicant requests that claim 40 be allowed in the next action.

## **Substantive Claim Rejections**

### **Double Patenting Claim Rejections**

**[0005]** Claims 27-29 and 35-37 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 15, 17, and 29 of U.S. Patent No. 7,317,843 to Sun et al. (hereinafter, "Sun")(*Office Action*, p.2). Applicant notes that claims 36 and 37 are canceled herein, and accordingly the obviousness-type double patenting rejection of these claims is moot.

**[0006]** Claims 1, 12-15, and 19-20 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-4, 11, 15-16, 19 and/or 29 of Sun in view of U.S. Patent Application Publication No. 2007/0206,246 to Tsuruoka et al. (hereinafter, "Tsuruoka")(*Office Action*, p.3).

**[0007]** Applicant is filing a terminal disclaimer in compliance with 37 CFR 1.321(c) along with this response to overcome the rejection based on nonstatutory double patenting.

### **35 U.S.C. §112 Second Paragraph Claim Rejections**

**[0008]** Claim 18 is rejected under 35 U.S.C. 112 second paragraph as being indefinite (*Office Action*, p.5). In making this rejection, the Office indicates that the claim recites in part, a "digital camera ... modify a color mapping function of the two images to cover a relatively larger range for a high contrast scene", (*Office Action*, p.5). The Office indicates that the term "relatively" is indefinite because there is a lack of a universal standard for measuring the degree intended for relatively larger to one of ordinary skill in the art (*Office Action*, p.5).

**[0009]** Appropriate correction has been made herein. More specifically, Applicant has amended claim 18 as described herein, so that the term "relatively" is no longer recited in the claim. Accordingly, Applicant requests that the 112 second paragraph rejection be withdrawn.

### **35 USC § 102 Claim Rejections**

**[0010]** Claims 1, 6-11, 24, 27, and 33 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent Application Publication No. 2003/0,133,019 to Higurashi et al (hereinafter, "Higurashi") (*Office Action*, p.6).

**[0011]** Claims 1, 2, 12-13, 21, 25-28, 30-32, 34, and 36-39 are rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. 2007/0,206,246 to Tsuruoka et al (hereinafter, "Tsuruoka") (*Office Action*, p.8).

**[0012]** Applicant notes that claims 36-39 are canceled herein, and accordingly the §102 rejection of these claims is moot. Applicant respectfully traverses the remaining §102 rejections, and requests reconsideration and allowance in light of the comments and amendments contained herein. Accordingly, Applicant requests that the rejections be withdrawn and that the case be passed along to issuance.

**[0013]**      **Claim 1** as amended recites a digital camera comprising:

an image sensor to capture a first image and a subsequent second image of a same scene using different exposure intervals, wherein one of the first and second captured images is underexposed, and wherein another of the first and second captured images is blurred;

a storage device to store the captured images; and

a processing unit coupled to the storage device to enhance the underexposed one of the first and second captured images with luminance correction to generate a resulting image of the scene which appears focused and properly exposed, wherein the luminance correction comprises:

determining a spatial coherence and color statistics of the first and second images; and

utilizing the determined color statistics and spatial coherence to enhance the underexposed one of the first and second images.

### **35 USC § 102 Claim Rejections – Based on Tsuruoka**

**[0014]**      In order for Tsuruoka to anticipate this claim, Applicant submits that Tsuruoka must disclose each and every element and feature of the claim and that they must be arranged in the same manner as the claim. Applicant respectfully submits that Tsuruoka does not disclose all of the claimed elements and features of claim 1.

**[0015]**      For example, Tsuruoka does not show or disclose a digital camera comprising, “an image sensor to capture a first image and a subsequent second image of a same scene using different exposure intervals, wherein one of the first and second captured images is

underexposed, and wherein another of the first and second captured images is blurred”, as recited in claim 1 (Emphasis Added).

**[0016]** Further, Tsuruoka does not show or disclose, “a processing unit coupled to the storage device to enhance the underexposed one of the first and second captured images with luminance correction to generate a resulting image of the scene which appears focused and properly exposed, wherein the luminance correction comprises: determining a spatial coherence and color statistics of the first and second images; and utilizing the determined color statistics and spatial coherence to enhance the underexposed one of the first and second images”, as recited in claim 1 (Emphasis Added).

**[0017]** Instead, Tsuruoka is directed to an image processing apparatus, for adjusting a gradation range of an input image (*Tsuruoka*, [0016]). More specifically, Tsuruoka describes an image processing apparatus which includes a Y/C separation unit which separates the input signal into a luminance signal and a color difference signal (*Tsuruoka*, Abstract and [0071]). A luminance correction unit extracts an edge from a luminance signal and corrects the luminance signal by gradation conversion curve (*Tsuruoka*, Abstract). A color difference correction unit corrects the color difference signal based on luminance signals obtained before and after the gradation correction (*Tsuruoka*, Abstract).

**[0018]** It is clear that Tsuruoka does not show or disclose that “the luminance correction comprises: determining a spatial coherence and color

statistics of the first and second images; and utilizing the determined color statistics and spatial coherence to enhance the underexposed one of the first and second images", as recited in claim 1. In fact, the Office acknowledges that Tsuruoka fails to disclose the digital camera "wherein the luminance correction comprises: determining a spatial coherence and color statistics of the first and second images; and utilizing the determined color statistics and spatial coherence to enhance an underexposed one of the first and second images" (*Office Action*, p.16).

**[0019]** Accordingly, for at least these reasons, claim 1 is allowable over Tsuruoka, and Applicant respectfully requests that the 102 rejection be withdrawn.

**[0020]** For the sake of thoroughness, Applicant notes that claim 1, as amended, includes limitations which were recited in dependent claim 15, as "originally-filed". For example, claim 1 now recites in part, "wherein the luminance correction comprises: determining a spatial coherence and color statistics of the first and second images; and utilizing the determined color statistics and spatial coherence to enhance the underexposed one of the first and second images." Applicant notes that claim 15 was not rejected under §102, but was instead rejected as obvious over Tsuruoka in view of U.S. Patent No. 6,556,704 to Chen (hereinafter, "Chen") (*Office Action*, p.16).

**[0021]** Applicant submits that in addition to not being anticipated by Tsuruoka, claim 1 is also not obvious in view of the Tsuruoka-Chen

combination. More specifically, Chen does not cure the deficiencies of Tsuruoka which were described above in response to the 102 rejection of claim 1. For example, Chen does not describe, "a processing unit coupled to the storage device to enhance the underexposed one of the first and second captured images with luminance correction to generate a resulting image of the scene which appears focused and properly exposed", as recited in claim 1 (Emphasis Added). Further, Chen does not describe, "wherein the luminance correction comprises: determining a spatial coherence and color statistics of the first and second images; and utilizing the determined color statistics and spatial coherence to enhance the underexposed one of the first and second images", as recited in claim 1.

**[0022]** Instead, Chen describes a system where two separate vertically mounted cameras take pictures of a scene (*Chen*, col.6 lns.40-60). The disparity created by the different locations of the two cameras facilitates generation of a depth mask which can be used to mask (obscure) parts of the scene which are in the background (*Chen*, Abstract and Fig. 1). For example, in Fig. 1 Chen shows a person 14 in the foreground of a scene, and shows a computer on a stand 15 in the background of the scene (*Chen*, Fig. 1). Based on depth values (the depth mask), items in the background of the scene (*e.g.*, the computer on the stand 15) are suppressed so that only a portion of the scene (*i.e.*, the items in the foreground of the scene (*e.g.*, the speaker 14)) is displayed.

**[0023]** In stark contrast, Applicants camera enhances the underexposed image to produces a high quality image of the whole scene



without visible blurring or darkness. Accordingly, Chen does not describe, "a processing unit coupled to the storage device to enhance the underexposed one of the first and second captured images with luminance correction to generate a resulting image of the scene which appears focused and properly exposed", as recited in claim 1. Instead, Chen describes producing a masked image 20 which only displays part of the scene.

**[0024]** **Claims 2, 12, 13, 21, 25 and 26** are allowable by virtue of their dependency upon claim 1. Additionally, claims 2, 12, 13, 21, 25 and 26 may be allowable over Tsuruoka for independent reasons.

### **35 USC § 102 Claim Rejections – Based on Higurashi**

**[0025]** In order for Higurashi to anticipate this claim, Applicant submits that Higurashi must disclose each and every element and feature of the claim and that they must be arranged in the same manner as the claim. Applicant respectfully submits that Higurashi does not disclose all of the claimed elements and features of claim 1.

**[0026]** For example, Higurashi does not show or disclose, "an image sensor to capture a first image and a subsequent second image of a same scene using different exposure intervals, wherein one of the first and second captured images is underexposed, and wherein another of the first

and second captured images is blurred”, as recited in claim 1 (Emphasis Added).

**[0027]** Instead, Higurashi describes an image processing apparatus which displays two images which represent two different scenes, although the two scenes have end portions which overlap (as shown in Figs. 5 and 12 of Higurashi). Higurashi describes correcting the parallel movement, rotation, and distortion of the two images to be joined so that the two images will correctly conform to each other to form a single image made up of the two different scenes (*Higurashi*, [0117]-[0121], and [0136] and Figs. 5 and 12).

**[0028]** Further, Higurashi does not show or disclose, “a processing unit coupled to the storage device to enhance the underexposed one of the first and second captured images with luminance correction to generate a resulting image of the scene which appears focused and properly exposed, wherein the luminance correction comprises: determining a spatial coherence and color statistics of the first and second images; and utilizing the determined color statistics and spatial coherence to enhance the underexposed one of the first and second images”, as recited in claim 1.

**[0029]** Instead, with regard to color correction of the two images to be joined, Higurashi simply describes that the two different scenes to be joined are displayed on a screen (*Higurashi*, [0136] and Fig. 12). Higurashi further describes that “[t]he user operates the knobs for

adjusting hue H, saturation S, and intensity I on the screen shown in Fig. 12", while comparing the two different images which are displayed, in order that both images have the same color tone (*Higurashi*, [0136] and Fig. 12).

**[0030]** Accordingly, for at least these reasons, claim 1 is allowable over *Higurashi*, and Applicant respectfully requests that the 102 rejection be withdrawn.

**[0031]** **Claims 6-11 and 24** are allowable by virtue of their dependency upon claim 1. Additionally, claims 6-11 and 24 may be allowable over *Higurashi* for independent reasons.

**[0032]**     **Claim 27** as amended recites a method comprising:

- exposing an image sensor to a scene;
- capturing a first image of the scene using a first exposure interval;
- capturing a second image of the scene after capturing the first image, the second image of the scene captured using a second exposure interval which is different from the first exposure interval, wherein one of the first and second captured images is underexposed, and wherein one of the first and second captured images is blurred; and
- applying luminance correction to the captured images to generate a resulting image of the scene which appears focused and properly exposed, wherein the application of luminance correction comprises:
  - determining a spatial coherence and color statistics of the first and second images; and
  - utilizing the determined color statistics and spatial coherence to enhance the underexposed one of the first and second images.

### **35 USC § 102 Claim Rejections – Based on Tsuruoka**

**[0033]**     In order for Tsuruoka to anticipate this claim, Applicant submits that Tsuruoka must disclose each and every element and feature of the claim and that they must be arranged in the same manner as the claim. Applicant respectfully submits that Tsuruoka does not disclose all of the claimed elements and features of claim 27.

**[0034]**     For example, Tsuruoka does not show or disclose, “exposing an image sensor to a scene; capturing a first image of the scene using a first exposure interval; capturing a second image of the scene after capturing the first image, the second image of the scene captured using a

second exposure interval which is different from the first exposure interval, wherein one of the first and second captured images is underexposed, and wherein one of the first and second captured images is blurred”, as recited in claim 27 (Emphasis Added).

**[0035]** Further, Tsuruoka does not show or disclose, “applying luminance correction to the captured images to generate a resulting image of the scene which appears focused and properly exposed, wherein the application of luminance correction comprises: determining a spatial coherence and color statistics of the first and second images; and utilizing the determined color statistics and spatial coherence to enhance the underexposed one of the first and second images”, as recited in claim 27.

**[0036]** Instead, Tsuruoka is directed to an image processing apparatus, for adjusting a gradation range of an input image (*Tsuruoka*, [0016]). More specifically, Tsuruoka describes an image processing apparatus which includes a Y/C separation unit which separates the input signal into a luminance signal and a color difference signal (*Tsuruoka*, Abstract and [0071]). A luminance correction unit extracts an edge from a luminance signal and corrects the luminance signal by gradation conversion curve (*Tsuruoka*, Abstract). A color difference correction unit corrects the color difference signal based on luminance signals obtained before and after the gradation correction (*Tsuruoka*, Abstract).

**[0037]** At the very least, Tsuruoka does not show or disclose that, “the application of luminance correction comprises: determining a spatial

coherence and color statistics of the first and second images; and utilizing the determined color statistics and spatial coherence to enhance the underexposed one of the first and second images", as recited in claim 27. In fact, the Office acknowledges that Tsuruoka fails to disclose the digital camera "wherein the luminance correction comprises: determining a spatial coherence and color statistics of the first and second images; and utilizing the determined color statistics and spatial coherence to enhance an underexposed one of the first and second images" (*Office Action*, p.16).

**[0038]** Accordingly, for at least these reasons, claim 27 is allowable over Tsuruoka, and Applicant respectfully requests that the 102 rejection be withdrawn.

**[0039]** For the sake of thoroughness, Applicant notes that claim 27, as amended, includes limitations which were recited in dependent claim 35, as "originally-filed". For example, claim 27 now recites in part, "wherein the luminance correction comprises: determining a spatial coherence and color statistics of the first and second images; and utilizing the determined color statistics and spatial coherence to enhance the underexposed one of the first and second images." Applicant notes that claim 35 was not rejected under §102, but was instead rejected as obvious over Tsuruoka in view of U.S. Patent No. 6,556,704 to Chen (hereinafter, "Chen") (*Office Action*, pp.16-17).

**[0040]** Applicant submits that in addition to not being anticipated by Tsuruoka, claim 27 is also not obvious in view of a Tsuruoka-Chen combination. More specifically, Chen does not cure the deficiencies of Tsuruoka which were described above in response to the 102 rejection of claim 27. For example, Chen does not describe, "applying luminance correction to the captured images to generate a resulting image of the scene which appears focused and properly exposed, wherein the application of luminance correction comprises: determining a spatial coherence and color statistics of the first and second images; and utilizing the determined color statistics and spatial coherence to enhance the underexposed one of the first and second images", as recited in claim 27.

**[0041]** Instead, Chen describes a system where two separate vertically mounted cameras take pictures of a scene (*Chen*, col.6 lns.40-60). The disparity created by the different locations of the two cameras facilitates generation of a depth mask which can be used to mask (obscure) parts of the scene which are in the background (*Chen*, Abstract and Fig. 1). For example, in Fig. 1 Chen shows a person 14 in the foreground of a scene, and shows a computer on a stand 15 in the background of the scene (*Chen*, Fig. 1). Based on depth values (the depth mask), items in the background of the scene (*e.g.*, the computer on the stand 15) are suppressed so that only a portion of the scene (*i.e.*, the items in the foreground of the scene (*e.g.*, the speaker 14)) is displayed.

**[0042]** In stark contrast, Applicants methods enhance the underexposed image to produces a high quality image of the whole scene

without visible blurring or darkness. Accordingly, Chen does not describe, "applying luminance correction to the captured images to generate a resulting image of the scene which appears focused and properly exposed", as recited in claim 27. Instead, Chen describes producing a masked image 20 which only displays part of the scene.

**[0043]** **Claims 28, 30-32 and 34** are allowable by virtue of their dependency upon claim 27. Additionally, claims 28, 30-32 and 34 may be allowable over Tsuruoka for independent reasons.

### **35 USC § 102 Claim Rejections – Based on Higurashi**

**[0044]** In order for Higurashi to anticipate this claim, Applicant submits that Higurashi must disclose each and every element and feature of the claim and that they must be arranged in the same manner as the claim. Applicant respectfully submits that Higurashi does not disclose all of the claimed elements and features of claim 27.

**[0045]** For example, Higurashi does not show or disclose, "exposing an image sensor to a scene; capturing a first image of the scene using a first exposure interval; capturing a second image of the scene after capturing the first image, the second image of the scene captured using a second exposure interval which is different from the first exposure interval, wherein one of the first and second captured images is underexposed, and



wherein one of the first and second captured images is blurred”, as recited in claim 27 (Emphasis Added).

**[0046]** Instead, Higurashi describes an image processing apparatus which displays two images which represent two different scenes, although the scenes have end portions which overlap (as shown in Figs. 5 and 12 of Higurashi). Higurashi describes correcting the parallel movement, rotation, and distortion of the two images to be joined so that the two images will correctly conform to each other to form a single image made up of the two different scenes (*Higurashi*, [0117]-[0121], and [0136] and Figs. 5 and 12). Higurashi describes joining two different scenes. Higurashi does not describe two images of the same scene which have been captured using different exposure intervals.

**[0047]** Further, Higurashi does not show or disclose, “applying luminance correction to the captured images to generate a resulting image of the scene which appears focused and properly exposed, wherein the application of luminance correction comprises: determining a spatial coherence and color statistics of the first and second images; and utilizing the determined color statistics and spatial coherence to enhance the underexposed one of the first and second images”, as recited in claim 27.

**[0048]** Instead, with regard to color correction of the two images to be joined, Higurashi describes that the two different scenes to be joined are displayed on a screen (*Higurashi*, [0136] and Fig. 12). Higurashi then describes that “[t]he user operates the knobs for adjusting hue H,

saturation S, and intensity I on the screen shown in Fig. 12", while comparing the two different images which are displayed, in order that both images have the same color tone (*Higurashi*, [0136] and Fig. 12).

**[0049]** Accordingly, for at least these reasons, claim 27 is allowable over *Higurashi*, and Applicant respectfully requests that the 102 rejection be withdrawn.

**[0050]** **Claim 33** is allowable by virtue of its dependency upon claim 27. Additionally, claim 33 may be allowable over *Higurashi* for independent reasons.

### **35 USC § 103 Claim Rejections**

**[0051]** Claims 16-17 and 22 are rejected under 35 U.S.C. §103(a) for obviousness over Tsuruoka (*Office Action*, p.12).

**[0052]** Claim 23 is rejected under 35 U.S.C. §103(a) for obviousness over Tsuruoka in view of U.S. Patent No. 6,885,492 to DeSimone et al. (hereinafter, "DeSimone") (*Office Action*, p.14).

**[0053]** Claims 14, 18, and 29 are rejected under 35 U.S.C. §103(a) for obviousness over Tsuruoka in view of U.S. Patent No. 6,075,889 to Hamilton et al. (hereinafter, "Hamilton") (*Office Action*, p.15).

**[0054]** Claims 15 and 35 are rejected under 35 U.S.C. §103(a) for obviousness over Tsuruoka in view of U.S. Patent No. 6,556,704 to Chen (hereinafter, "Chen") (*Office Action*, p.16).

**[0055]** Claim 19 is rejected under 35 U.S.C. §103(a) for obviousness over Tsuruoka in view of U.S. Patent No. 6,879,731 to Kang et al. (hereinafter, "Kang") (*Office Action*, p.17).

**[0056]** Claim 5 is rejected under 35 U.S.C. §103(a) for obviousness over Higurashi (*Office Action*, p.18).

**[0057]** Claims 3-4 are rejected under 35 U.S.C. §103(a) for obviousness over Tsuruoka in view of Higurashi (*Office Action*, p.19).

**[0058]** Applicant respectfully traverses each of these 35 U.S.C. §103 rejections, and requests reconsideration and allowance in light of the comments and amendments contained herein.

**[0059]** **Claims 3-5, 14-19, 22-23, 29 and 35** are rejected under 35 U.S.C. §103(a) as being obvious over one or more of Tsuruoka and/or DeSimone and/or Hamilton and/or Chen and/or Kang and/or Higurashi. The Applicant notes that none of claims 3-5, 14-19, 22-23, 29 and 35 are independent claims, and that each of these claims ultimately depend from one of the independent claims (here claims 1 and 27 respectively). Applicant further notes that it is axiomatic that any dependent claims which depend from an allowable base claim are also allowable, and

therefore the Applicant does not believe that it is necessary to present arguments in favor of claims 3-5, 14-19, 22-23, 29, and 35, as these claims should be allowable for at least the reasons discussed above in response to rejection of the independent claims, as well as for their own recited features which are neither shown nor supported by the cited references. Further, Applicant notes that Tsuruoka and/or DeSimone and/or Hamilton and/or Chen and/or Kang fail to cure the deficiencies described above with respect to Higurashi, and the §102 rejections of independent claims 1 and 27. Further, Applicant notes that DeSimone and/or Hamilton and/or Chen and/or Kang and/or Higurashi fail to cure the deficiencies described above with respect to Tsuruoka, and the §102 rejections of independent claims 1 and 27.

**[0060]** With regard to amended claims 15 and 35, Applicant submits that Tsuruoka and/or Chen do not teach or suggest that, "both the first and second images are captured using an exposure bracketing feature when a shutter button is pressed, wherein the first image is underexposed, and wherein the second image is blurred", as recited in these claims.

**[0061]** Accordingly, Applicant requests that the §103 rejections be withdrawn and that claims 3-5, 14-19, 22-23, 29 and 35 be allowed in the next action.

## **New Claim**

**[0062]** In the last Action the Office indicated that claim 20 was dependent upon a rejected base claim, but that the claim would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims (*Office Action*, p.20). Applicant appreciates the indication of allowability, and new claim 40 has been added herein to claim the subject matter which has been indicated as allowable by the Office (*Office Action*, p.20).

**[0063]** New claim 40 simply represents the limitations of claim 20 rewritten in independent form to include all of the limitations of the base claim (original claim 1) and any intervening claims. The presentation of the indicated allowable material as new claim 40 is purely of form (*i.e.*, dependent format to independent format), and is not to overcome prior art or any other objections. Accordingly, Applicant requests that claim 40 be allowed in the next action.

## **Dependent Claims**

**[0064]** In addition to its own merits, each dependent claim is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each dependent claim where its base claim is allowable.

## **Conclusion**

**[0065]** All pending claims are in condition for allowance. Applicant respectfully requests reconsideration and prompt issuance of the application. If any issues remain that prevent issuance of this application, the Office is urged to contact the undersigned attorney before issuing a subsequent Action.

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Respectfully Submitted,

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